A METHOD FOR DETERMINING THE VALUE OF AN AVERAGE SPACE OF A LATITUDE-LEVEL IN TERMS OF A MICROMETER-TURN.

By Frank Schlesinger.

In the determination of latitudes by means of the zenith-telescope it is necessary to know the average value of the spaces on the latitude-level. The following method has the advantage of being executed under precisely the same conditions that prevail during the observations for latitude themselves.

Two stars having nearly equal declinations and differing a few minutes in Right Ascension are selected. The telescope is pointed so that both will transit near the middle of the field, and micrometer-readings are taken upon each. Between the two transits, however, the telescope's inclination is changed so that the bubble of the latitude-level traverses several divisions. Consequently, the difference of micrometer-readings ($\Delta' R$) should be corrected by the difference of level-readings ($\Delta' l$), in order to obtain the true difference of declination ($\Delta\ \delta$) between the two stars. That is—

$$\Delta' R \pm \Delta' l = \Delta\ \delta$$

On a succeeding night the same observation is to be made upon the same stars, with this exception: the inclination of the telescope must be changed in the opposite direction between the two transits, so that if on the previous night the level-readings had been increased they must now be decreased, or *vice versa*. We now have,

$$\Delta'' R \mp \Delta'' l = \Delta\ \delta$$

As we may assume that the difference of declinations is the same as on the previous night, we get by subtraction,

$$\Delta'' R - \Delta' R = \Delta'' l - \Delta' l$$

This enables us to express one space of the level in terms of one turn of the micrometer, which is what was required. It will be noticed that accurate knowledge of the declinations is by no means necessary, and that therefore the two stars may be selected from the *Durchmusterung*. Indeed, suitable stars may usually be found by pointing the telescope quite at random in the meridian.

The following is a numerical example from actual observation. The zenith telescope employed, like all other modern ones, is

provided with two latitude-levels; but for the sake of clearness data are given only for the upper one.

	Right Ascension.	Declination (1900).
Star 1	$9^h\ 14^m\ 50^s$	$+\ 40^\circ\ 11'\ 40''$
Star 2	9 28 45	40 10 30

1900, April 8: Star 1

Level Readings. *North End.*	*South End.*	Micrometer Readings.
5.9	28.6	15.5395

1900, April 8: Star 2

13.8	36.6	13.0390

1900, April 9: Star 1

16.0	37.8	15.2435

1900, April 9: Star 2

5.4	27.4	13.2515

Hence, we have,

$$\Delta' R = 2.5005 \qquad \Delta' l = -\ 7.95 \text{ divisions}$$
$$\Delta'' R = 1.9920 \qquad \Delta'' l = +\ 10.50$$

Consequently, one division of the level is equivalent to

$$\frac{0.5085}{18.45} = 0.0276 \text{ micrometer turns.}$$

Nine determinations similar to the above gave only $0^R.0004$ as the probable error of a single determination. This corresponds to $0''.016$, one turn of the micrometer being about $40''$.

The above method, appropriately modified, may also be applied to striding-levels of meridian instruments.

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OBSERVATION OF *LEONIDS* AT POMONA COLLEGE, CLAREMONT, CALIFORNIA.

COMMUNICATED BY F. P. BRACKETT.

After the disappointment of last year, when an organized force of over fifty observers was trained for a campaign of at least a week, with charts and tables, and three photographic stations, and were met with almost total cloudiness all the week and a